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Free and Costly Trade Credit: A Comparison of Small Firms

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Trade credit is a major source of financing for small firms. This article examines the extent to which small firms use trade credit as well as the extent to which they use "free" versus "costly" trade credit. Those firms that use free trade credit make payment within the discount period. Alternatively, firms that use costly trade credit forego available discounts and may also make payment after the due date thereby incurring substantial additional costs. Results reveal that larger firms were more likely to use trade credit. Younger firms were more likely to be denied trade credit and were also more likely to pay late as were firms with a history of credit difficulties and those with high levels of debt. Firms owned by white women and Hispanic men were significantly less likely to have trade credit than firms owned by white men. Further, firms owned by black men were significantly more likely to be denied trade credit.

I. Introduction

Access to capital is an ongoing challenge for small firms. Unlike larger firms, small firms do not have access to the public debt and equity markets, major sources of funding for publicly held firms. Alternatively, small firms are heavily reliant on banks for both short and longer term credit. Even in the case of bank borrowing, however, informational asymmetries may make it difficult if not impossible for some firms to borrow. This is particularly true for privately held firms, smaller firms, newer firms, firms with an inconsistent track record of profitability, or firms lacking assets that can be used as collateral. Thus, by default, trade credit often becomes the dominant source of external funding for many small firms. Bitler et al. (2001) found that 60 percent of the firms included in the 1998 Survey of Small Business

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Finances used trade credit. This level of usage was higher than for any other financial service with the exception of checking.

Trade credit exists when a firm buys goods or services from a supplier who does not require immediate payment. This transaction creates an account payable for the firm and an account receivable for the supplier. Many suppliers offer trade credit as a way to increase sales; they recognize that smaller, cash constrained firms may not have sufficient liquidity to make payment on demand and are required to collect their sales before paying for their financing. They are able to pay at designated intervals, however. Typically the supplier indicates the interval for payment, i.e. 30 days or 60 days. The supplier may also offer a discount for early payment. Terms of 2/10 net 30, for example, mean that the firm receives a 2 percent discount for payment within 10 days. If the firm does not take the discount, it is nevertheless expected to pay within 30 days. Firms that fail to make payment within the designated payment period may incur additional penalties or interest charges for late payment or may be denied credit in the future.

From the firm's standpoint, taking a discount is an attractive option because it reduces the cost of goods or services purchased. There is a substantial cost associated with foregoing available discounts, so firms with sufficient liquidity typically take them (The implicit cost of forgoing the discount in the instance of 2/10 net 30 is 36 percent). Throughout this article, "free" trade credit will refer to firms that make payment within the discount period. "Costly" trade credit refers to firms that pay after the end of the discount period thereby foregoing discounts and incurring substantial financing costs. If firms fail to make payment within the full payment period, they may incur additional fees and charges for late payment. Under those circumstances, trade credit becomes an extremely costly form of financing.

This article will use data from the 1998 Survey of Small Business Finances (SSBF) to examine the use of trade credit by small firms. It will examine the types of firms that use trade credit, as well as those that take discounts and those that pay late after the end of the designated payment period. In particular, this research will explore differences in the use of trade credit by gender, race, and ethnicity. This first section has focused on the role and importance of trade credit to small firms. The second section presents the findings of prior research, while Section III provides a description of the data used for this study. Section IV includes univariate results using data from the 1998 Survey of Small Business Finances. Sections V and VI describe the multivariate models used for this analysis and their results. The final section of the paper includes a discussion of findings and their implications.

I. Prior Research

Prior research has revealed both a "transactions" motive and a "financing" motive for the use of trade credit. Ferris (1981) was the first to put forth the transactions motive. He argued that trade credit allows firms to manage their cash flows more predictably and thus, reduce their holdings of precautionary cash balances. According to Ferris, the flow of goods from suppliers is unpredictable. Given this level of uncertainty, firms would need to hold larger cash balances if payment on delivery was required. Trade credit alleviates the need for holding higher cash balances and allows firms to make payments for goods at regular intervals.

Elliehausen and Wolken (1993) addressed both the transactions motive and the financing motive for trade credit using data from the 1987 National Survey of Small Business Finances. They found that firms with a larger volume of purchases and greater variability in the timing of delivery were more likely to use trade credit to satisfy their transactions

requirements. These firms would face a higher level of uncertainty in the flow of goods and payments for those goods.

In terms of the financing motive, Elliehausen and Wolken found that higher risk firms defined as firms having either higher debt and/or lower liquidity were more likely to use trade credit. They concluded that higher risk firms were more likely to be credit constrained. Thus, they used more costly trade credit because they could not obtain less costly bank loans. Alternatively, lower risk firms either use banks as a source of credit or have sufficient liquidity to take advantage of discounts, both of which represent less costly alternatives

Petersen and Rajan (1997) addressed the relationship between credit rationing and the demand for trade credit, also using the 1987 National Survey of Small Business Finances. They found that smaller firms and firms with shorter banking relationships were more reliant on trade credit. They concluded that, since trade credit is more costly than credit from financial institutions, the only firms that would use it are those that are credit constrained.

In a similar study, Danielson and Scott (2000) explored the impact of credit rationing on the demand for trade credit using the National Federation of Independent Businesses' 1995 Credit, Banks, and Small Business Survey. They found that small firms were more likely to rank trade credit as either a primary or secondary source of capital if their most recent loan had been denied and if their credit needs were still unmet. They also found that younger firms and firms located in less concentrated banking markets were more likely to rank trade credit as a primary or secondary source of capital. Highly concentrated banking markets are characterized by a higher level of competition for business customers and, correspondingly, by greater availability of bank capital.

Relatively few studies have examined the relationship between gender, race, and ethnicity on the use of trade credit. A study by Aaronson et al. (2001) did, however, focus on the use of trade credit in one black and one Hispanic neighborhood in Chicago. Aaronson et al. found that black-owned firms used less trade credit, were less likely to take discounts, and were more likely to pay after the due date than white-owned firms. They also found that Hispanic-owned firms dealing with Hispanic–owned suppliers were more likely to receive trade credit.

Extending their study to use data from the 1998 Survey of Small Business Finances, Aaronson et al. again found that minority-owned firms were less likely to use trade credit and less likely to take discounts than white-owned firms. Their results also indicated that smaller firms and firms or owners having poor credit histories were less likely to use trade credit. Aaronson et al. concluded that suppliers have a monitoring advantage that allows them to develop specialized knowledge about an industry and firms within it. Longer supplier relationships add to that informational advantage and enables suppliers to judge the creditworthiness of firms they do business with.

II. Description of the Data

The Survey of Small Business Finances (SSBF), formerly called the National Survey of Small Business Finances, is conducted every five years by the Federal Reserve. The 1998 Survey is the most recent for which data are publicly available. It includes balance sheet and income statement data on 3,561 small firms in the United States. A small firm is defined as one having 500 or fewer employees. The SSBF also includes information on financial services used and financial service providers for the included firms. Survey firms represent a random sample of U.S. firms stratified by size, geographic location, gender, and racial and ethnic

identity of the firm owners. Sample weights are included so that population estimates can be constructed from the sample data.

Table I provides information on characteristics of firms included in the 1998 SSBF. The data include 2,190 firms owned by white men, 605 firms owned by white women, 195 firms owned by black men, 209 firms owned by Hispanic men, and 153 firms owned by Asian men. Data were not included for black, Hispanic, or Asian women due to the relatively small number of minority women business owners included in the SSBF.

Table 1 reveals that the firms owned by white men were significantly larger than firms owned by white women, black men, and Hispanic men in terms of total assets, total sales, and total number of employees. In fact, firms owned by white men were approximately twice as large as firms owned by white women and three times as large as firms owned by black and Hispanic men in terms of average total assets. A similar pattern holds for average total sales. Firms owned by white men were also significantly larger than firms owned by Asian men in terms of total assets and total employees. These distinctions are noteworthy, because prior research has revealed that larger firms are less reliant on trade credit than smaller firms firms.

Firms owned by white men were also significantly older than firms owned by the other four groups, having an average age of 14.55 years. Nevertheless, all of the firms were at least 10 years old on average indicating that firms in the sample were established and had been operating for a period of time. In terms of owner age and experience, white male firm owners were significantly older and had significantly more years of business experience that other firm owners. The average age for a white male owner was 50.93 years. These owners, in turn, had an average of 19.91 years of experience. In spite of this difference, however, the average age for firm owners in all five groups was at least 45 indicating a relatively mature group. Similarly, all of the firm owners had a minimum of 14 years of business experience.

Table II continues the comparison between the different groups of small firms included in the 1998 SSBF. It indicates that firms owned by white men were significantly more likely to be organized as corporations or limited liability entities than those owned by white women or Hispanic men. In terms of organizational status, 48.68 percent of the firms owned by white men were organized as corporations compared to 37.91 percent of the firms owned by white women and 36.06 percent of the firms owned by Hispanic men.

A high percentage, over 80 percent, of all five groups of firms were family-owned firms. Firms owned by white women and those owned by black or Hispanic men were significantly more likely to be family-owned than those owned by white men, however. There were no differences between the groups in terms of educational level. In fact, over 50 percent of all five groups had attended college indicating a relatively well-educated group of firm owners.

In terms of industrial classification, firms owned by white women were significantly more likely to be in service lines of business than those owned by white men. Similarly, firms owned by white women, Hispanic men, and Asian men were significantly less likely to be in the fields of construction or mining. Firms owned by Asian men were significantly more likely to be in retailing.

Firms owned by black and Hispanic men were rated as being significantly more risky using Dun & Bradstreet ratings than firms owned by white men. They were also significantly more likely to have declared either personal or business bankruptcy. Black firm owners were significantly more likely to have had personal delinquencies or judgments rendered against them within the previous three years. Overall, firms owned by black or Hispanic men were

significantly more likely than white men to have some history of credit difficulties. Although 21.45 percent of the white male business owners had some history of credit difficulty, 38.70 percent of black male business owners and 29.74 percent of Hispanic male business owners had a history of credit problems. A history of credit difficulties may make it more difficult for firms to obtain bank credit and thus more reliant on trade credit. Alternatively, however, firms with a history of credit difficulties may also have a harder time obtaining credit from suppliers.

III. Small Firms' Use of Trade Credit

Table III reveals that a high percentage of all small firms included in the 1998 SSBF used trade credit (trade). Firms owned by white men were significantly more likely to use trade credit than those owned by white women, black or Hispanic men, however. For white men, 66.67 percent used trade credit compared to 53.59 percent of white women, 51.13 percent of black men, 46.24 percent of Hispanic men, and 60.74 percent of Asian men. Black men were significantly more likely to have been denied trade credit than white men (denytrade). Although only 4.80 percent of white men had been denied trade credit, 12.84 percent of black men had been denied. Black men were also significantly more likely to pay off their trade credit accounts late (paylate); 42.11 percent of white men had paid late compared to 61.69 percent of black men.

Table III also reveals that white male owners financed a significantly higher percentage of their purchases with trade credit than the other four types of firm owners (trade%). White male owners financed 72.10 percent of their purchases with trade credit compared to 66.91 percent for white women, 61.57 percent for black men, 58 percent for Hispanic men, and 54.24 percent for Asian men. Further, white men took a significantly higher percentage of the cash discounts available to them (cashdisc) than black or Asian men. The fact that white men and white women took such a high percentage of cash discounts (60.01 percent and 64.01 percent) suggests that they were aware of the cost associated with foregoing discounts. Similarly, black, Hispanic, and Asian men all took at least 40 percent of the discounts offered. In spite of this awareness, however, firms included in the SSBF paid off a relatively high percentage of trade balances late (%late), approximately 30 percent for all five groups. The fact that such a high percentage of small firms pay balances late suggests that they use trade credit as a source of financing in addition to using it to satisfy their transactions needs.

Table IV compares key financial ratios for those small firms that were users of trade credit. Both mean and median amounts are shown, since mean amounts were skewed in some instances. Total accounts payable (acctpay) and the ratio of accounts payable to total assets (apassts) are both indicators of the extent to which firms use trade credit. Although white male-owned firms had significantly higher levels of accounts payable, their ratio of accounts payable to total assets was not significantly higher than for the other four groups of firms. Values ranged from a low of 12.5 percent for firms owned by Asian men to 17.6 percent for firms owned by white men.

The level of inventories (inv) and the ratio of inventories to assets (invassts) are indicative of the extent to which a firm might need trade credit. One would assume that firms with higher levels of inventory would have higher transactions requirements. Similarly, the inventory turnover ratio (invturn) provides a measure of the speed with which firms sell their products. A higher turnover would suggest the need for more frequent shipments of inventory and, thus, more frequent payments if cash were paid on delivery. The use of trade credit would

be particularly beneficial in smoothing the cash flow cycles of firms that have large and rapidly moving inventories.

Table IV reveals that although white males had significantly higher levels of inventories than the other four types of firms, they did not have a significantly higher ratio of inventory to assets. For that ratio, values ranged from a low of 14.6 percent for firms owned by black men to a high of 21.7 percent for firms owned by Asian men. In terms of inventory turns, firms owned by Hispanic men had the highest average inventory turn, 21.8, followed by white men with an inventory turn of 18.4.

The ratio of total debt to total assets (TDTA) and the quick ratio (quickrat) are measures of credit quality and liquidity. One would anticipate that firms with a high debt ratio would have a difficult time obtaining additional bank financing. Thus, trade credit might serve as an alternative source of financing. Alternatively, however, if suppliers have "insider information" about the credit quality of the firm, they might be reluctant to extend trade credit. Table IV reveals that firms owned by white women and those owned by Asian men had significantly lower ratios of total debt to total assets than firms owned by white men. Mean levels ranged from a low of 42.8 percent for Asian men to a high of 54.9 percent for Hispanic men.

A low quick ratio could be indicative of a cash shortage. Firms in this position would have a particularly difficult time paying for goods on delivery. This disadvantage could cause them to rely more heavily on trade credit. Simultaneously, it could also mean that they are less able to take advantage of discounts meaning that trade credit would become a "costly" rather than a "free" source of financing. Table IV reveals that firms owned by white men, white women, and black men had higher average quick ratios than firms owned by Hispanic and Asian men. Values for this ratio were highly skewed, however, and there were no significant differences between the five groups of firms.

Another factor that may affect a firm's use of trade credit is its ability to obtain bank financing. Firms that are able to obtain bank loans may still be willing to use "free" trade credit, but they may be reluctant to use "costly" trade credit given that bank financing is typically much less expensive. Alternatively, firms that have been denied bank credit may be more heavily reliant on both "free" and "costly" trade credit because they do not have other sources of financing.

Table V reveals that firms owned by white women were significantly less likely to have applied for a loan within the previous three years than white men (mrlapp). Although 24.4 percent of white men had applied for loans, only 19.9 percent of white women had done so. In terms of loan approvals, black, Hispanic, and Asian men were significantly more likely to have been turned down for a loan (mrldeny) within the previous three years than white men. Although only 6.4 percent of the white men and 4.9 percent of the white women were denied a loan, 19.6 percent of black men, 12.8 percent of Hispanic men, and 11.5 percent of Asian men were denied loans. Further, white women, black men and Hispanic men were significantly less likely than white men to have applied for a loan at all because they assumed that they would be denied (noapply). One would anticipate that firms that are less likely to apply for loans or those that are less likely to obtain them would be more reliant on trade credit. If this is the case, one would expect that white women, black, Hispanic, and Asian men would have a greater demand for trade credit.

Prior research has suggested that the nature of the banking market also has an effect on both the availability of bank credit and the desire for trade credit (Danielson & Scott, 2000). Banking markets that are highly concentrated would consist of many competing financial

institutions offering loans at a reasonable price. This should lessen the demand for trade credit. Similarly, firms located in urban areas should have access to a broader array of bank credit providers than those in more rural areas. Table V reveals that a significantly lower percentage of firms owned by Hispanic and Asian men were located in highly concentrated areas as measured by the Herfindahl index (concent). Firms owned by black, Hispanic, and Asian men were significantly more likely to be located in urban areas, however (urban). This apparent contradiction may suggest that, although minority-owned firms were more likely to be located in densely populated urban areas, those areas tended to be served by fewer banks.

A final measure of the availability of bank credit was the length of the firm's relationship with its primary financial provider (relation). Petersen and Rajan (1997) contend that longer banking relationships increase the availability of credit. Given that, firms that have longer banking relationships should have an easier time obtaining bank loans and thus be less dependent on trade credit as a source of financing. Table V indicates that firms owned by white men had significantly longer banking relationships than those owned by white women or by black, Hispanic, or Asian men. This would suggest that, although white men might use "free" trade credit to satisfy their transactions need, they would be less likely to use "costly" trade credit as a source of financing.

IV. Multivariate Analysis

The univariate analysis provided above suggests differences in the use of trade credit by gender, race, and ethnicity. Prior research also suggests that a firm's use of trade credit is a function of owner characteristics such as education and experience, firm characteristics such as firm size and firm age, or characteristics that might affect the firm's banking relationships. Multivariate analysis was used to test these theories using three different groups of independent variables. Unlike univariate analysis which tests the effect of one variable on the dependent variable, multivariate analysis tests the effect of several independent variables acting in concert on the dependent variable. In each case the dependent variable was a dichotomous variable indicating whether or not the firm used trade credit (trade).

The first set of independent variables represented characteristics of the firm owner including age, educational level, years of experience, gender, race, and ethnicity. The hypotheses being tested was that owner characteristics could affect either the owner's willingness to use trade credit or his or her ability to secure it. Age was selected as an independent variable, because prior research indicates that risk aversion increases with age (Morin & Suarez, 1983; Riley & Chow, 1992). Given that, one would anticipate that older firm owners may be less willing to use any type of short term debt that could increase the riskiness of the firm. Alternatively, younger firm owners may have more ambitious growth objectives and may thus be more receptive to using all available sources of financing including trade credit. In light of the fact that trade credit is a "free" source of financing if paid off within the payment period, one would assume that more highly educated firm owners as well as those with more experience would be more aware of its benefits and would prefer it over interest-bearing sources.

Prior research has suggested that women small business owners are less likely to apply for loans than men (Coleman, 2002a). Further, prior research indicates that minority firm owners are less likely to use trade credit than white firm owners (Aronson et al., 2001). These findings justify the inclusion of variables representing gender, race, and ethnicity. Since univariate results indicate that the size of firms included in the sample varied considerably by

gender and minority status, these variables were interacted with the size variable (logsales). Sizeww is a variable representing the interaction of firm size and a variable representing white women, while sizebm, sizehm, and sizeam represent the interaction of firm size with variables representing black men, Hispanic men, and Asian men respectively. The variable representing the interaction of size and white men was omitted from the model to serve as a reference.

A logistic regression model was developed having the following form:

Model 1: Owner Characteristics

$$\text{Trade} = a + b_1\text{ownage} + b_2\text{ed} + b_3\text{exp} + b_4\text{sizeww} + b_5\text{sizebm} + b_6\text{sizehm} + b_7\text{sizeam} + e$$

Logistic regression analysis was used in this instance since the dependent variable was dichotomous rather than continuous (Aldrich & Nelson, 1984; Cramer, 1991; Demaris, 1992).

A second logistic regression model was developed, also using trade as the dependent variable, but with independent variables representing characteristics of the firm. It seems reasonable to assume that characteristics of the firm would affect its demand for or ability to secure trade credit. The independent variables in this model included firm age, firm size, organizational status, MSA designation, and industry sector. Prior research indicates that younger firms and smaller firms are more reliant on trade credit as a source of financing (Petersen & Rajan, 1997; Danielson & Scott, 2000), possibly because they do not qualify for bank loans. Organizational status was also included as an independent variable to determine if firms organized as corporations have less demand for trade credit, because they are more attractive to banks. Similarly, MSA designation was included to determine if firms operating in urban areas are less likely to use trade credit, because there is greater availability of bank credit. Variables representing industry sector were included, because one would assume that sectors having higher levels of inventory would have a higher demand for trade credit. The variable representing firms in the manufacturing sector (manuf) was omitted to serve as a reference.

The second logistic regression model took the following form:

Model 2: Firm Characteristics

$$\text{Trade} = a + b_1\text{firmage} + b_2\text{logsales} + b_3\text{org} + b_4\ \text{urban} + b_5\text{serv} + b_6\text{transp} + b_7\text{retail} + b_8\text{insre} + b_9\text{consmin} + e$$

Finally, a third model was developed representing aspects of the firm's banking relationships as well as financial ratios that might affect the banking relationship and, by extension, the demand for trade credit. The independent variables in this model included the length of the firm's primary banking relationship, the degree of bank concentration, whether or not the firm was turned down for its most recent loan, credit history, and financial ratios representing leverage, liquidity, and the level of inventories.

Petersen and Rajan (1997) found that firms with longer banking relationships were more likely to use bank loans and were less dependent on trade credit as a source of financing. Danielson and Scott (2000) found that firms in highly concentrated banking markets had greater access to bank loans, probably due to the higher level of competition. Loan denials

were used as an independent variable, because it seems reasonable to assume that firms that have been denied bank loans would be more dependent on trade credit.

Elliehausen and Wolken (1993) found that riskier firms defined as firms having higher levels of debt or low liquidity were more reliant on trade credit, possibly because they were less attractive to banks. Finally, one would anticipate that firms with high relative levels of inventory or high inventory turnover would use a higher level of trade credit to finance those inventories.

The third logistic regression model took the following form:

Model 3: Banking Relationships and Financial Ratios

$$\text{Trade} = a + b_1\text{relation} + b_2\text{concent} + b_3\text{mrldeny} + b_4\text{badcred} + b_5\text{TDTA} + b_6\text{quickrat} + b_7\text{invassts} + b_8\text{invturn} + e$$

The variables in all three models are listed and defined in Appendix A. A correlation analysis indicated that the independent variables used were not highly correlated with each other or with the dependent variable.

V. Results

Results of the logistic regression analyses are shown in Table VI. The first model examined the effect of owner characteristics on the firm's use of trade credit. Significant independent variables included owner age (-) and years of experience (+); younger owners and owners with more experience were more likely to use trade credit. Younger owners may be less risk averse and thus more willing to take on debt, including short term debt in the form of trade credit. Similarly, younger owners may have more aggressive goals relating to growth and may thus require additional financing in the form of trade credit. Owners with more experience may have a greater awareness of the value of free trade credit compared to interest-bearing bank loans.

The variables representing the interaction of firm size and white women (sizeww) and firm size and Hispanic men (sizehm) were significant and negative indicating that these groups were significantly less likely to use trade credit than comparably sized firms owned by white men. Within the context of this model, we cannot determine if this is the case because they prefer to use less trade credit or if it is because they are more likely to be denied trade credit. The signs for sizebm and sizeam were also negative but not significant.

In terms of firm characteristics (Model 2), larger firms and firms organized as corporations were significantly more likely to use trade credit. Larger firms may have the market power necessary to demand credit from suppliers. Similarly, firms organized as corporations may give the impression of being more firmly established and may thus be in a better position to secure trade credit. The industry sectors representing service, transportation, retail, and insurance/real estate were all significantly less likely to use trade credit than manufacturing firms. This finding is not surprising given that one would expect manufacturers to carry relatively high levels of inventory.

The third model examined the effect of bank relationships and financial ratios. Results indicate that firms with longer banking relationships were significantly more likely to use trade credit. It is possible that firms that are capable of establishing long term relationships with

banks will also be more likely to establish positive relationships with suppliers. Table VI also indicates that firms with a history of credit difficulties (badcred) and high levels of leverage (TDTA) were more likely to use trade credit. Since these same firms might experience greater difficulty in securing bank loans, it is reasonable to expect that they would turn to trade credit as an alternative source of short term borrowing.

Table VI reveals that firms with a higher level of liquidity (quickrat) were more likely to use trade credit. This suggests that suppliers may have "inside information" on buyer firms that enables them to distinguish between those firms that will be able to make payments on time and those that will not. Finally, firms with higher levels of inventory (invassts) and higher inventory turns (invturn) were significantly more likely to use trade credit as hypothesized. One would expect to find that such firms would have a greater demand for trade credit to satisfy their transactions requirements..

VI. Further Analysis

As if often the case, the results of the regression analyses thus far have raised as many questions as they have answered. Specifically, why do firms owned by white women and Hispanic men use less trade credit than firms owned by white men? Further, for those firms that do use trade credit, how do they use it? Is it a source of liquidity as Ferris (1981) suggests, or is it a source of financing (Elliehausen & Wolken, 1993; Petersen & Rajan, 1997)? To explore these questions, three additional dependent variables were tested in each of the three models representing owner characteristics, firm characteristics, and bank relationships and financial ratios. The second dependent variable tested was a dichotomous variable representing whether or not the firm had been denied trade credit (denytrade). Firms that are denied trade credit are also very likely to be denied credit from banks for the same reasons. One would anticipate that such firms would be rather severely credit constrained given that they are unable to obtain credit from the two dominant sources of short term financing for small firms. The third dependent variable was also a dichotomous variable representing payment after the due date (paylate). Firms that pay suppliers after the due date not only lose the benefit of a discount for early payment, but they may also incur late fees and/or interest charges and perhaps even be denied trade credit in the future if the lateness of payment is very pronounced. At that point, previously free trade credit can become very costly.

Logistic regression models were developed in which either denytrade or paylate were the dependent variables. These models took the following form:

Model 1: Owner Characteristics

Denytrade (or paylate) = $a + b_1$ownage + $b_2$ed + $b_3$exp + $b_4$sizeww + $b_5$sizebm + $b_6$sizehm + $b_7$sizeam + e

Model 2: Firm Characteristics

Denytrade (or paylate) = $a + b_1$firmage + $b_2$logsales + $b_3$org + b_4 urban + $b_5$serv + $b_6$transp + $b_7$retail + $b_8$insre + $b_9$consmin + e

Model 3: Banking Relationships and Financial Ratios

Denytrade (or paylate) = $a + b_1$relation + $b_2$concent + $b_3$mrldeny + $b_4$badcred + b_5TDTA + $b_6$quickrat + $b_7$invassts + $b_8$invturn + e

Results for these additional models are also provided in Table VI. For the models using denytrade as the dependent variable the owner characteristic representing experience was significant and negative; firm owners with fewer years of experience were significantly more likely to be turned down for trade credit. The variable representing black men was significant and positive indicating that black men were more likely to be turned down for trade credit than white men. Results for white women, Hispanic men, and Asian men were not significant.

In terms of firm characteristics, younger firms (firmage) were significantly more likely to be turned down as were firms organized as corporations and firms located in urban areas. Service firms were significantly more likely to be turned down than manufacturing firms, while firms in the transportation, retail, and insurance/real estate industries were less likely to be turned down.

Finally, in the area of banking relationships, firms that had been denied loans, those that had a history of bad credit, and those that had high levels of debt were also significantly more likely to be turned down for trade credit. This finding again suggests that suppliers may have insider information on the financial condition of firms that enables them to discriminate between good credit risks and bad ones.

Turning to the models that used paylate as the dependent variable, the owner characteristic representing age (ownage) was significant and negative. Younger firm owners were significantly more likely to pay late. In addition, firms headed by Hispanic men were significantly less likely to pay after the due date. Variables representing white women, black men, and Asian men were not significant.

The firm characteristics representing firm age (-), firm size (+), and organizational status (+) were all significant revealing that younger firms, larger firms, and firms organized as corporations were all more likely to pay late. Younger firms may pay late because they may be going through a growth stage and may be constrained for cash. Alternatively, younger firms may be less attractive to banks because they do not have a track record. Thus, they may be more dependent on trade credit as a source of financing. Larger firms and firms organized as corporations may pay late because they have sufficient market power to do so. Firms in the service, transportation, retail, and insurance/real estate industries were all significantly less likely to pay late than firms in the manufacturing industry suggesting that manufacturers may be more heavily dependent on trade credit as a source of financing. It may also mean (and is likely) that manufacturing firms have a longer working capital cycle.

Results of the third model which included characteristics of the banking relationship and financial ratios indicate that the variables representing loan denials, credit history, and leverage were significant and positive. Firms that had been denied loans, those with a history of credit difficulties, and those with higher levels of debt were more likely to pay late. This finding is not surprising given that one would expect that such firms might have a more difficult time obtaining bank credit. In all likelihood they are forced to rely on trade credit as source of financing. Firms with higher quick ratios, higher ratios of inventories to assets, and higher inventory turns were also significantly more likely to pay after the end of the payment period. It is possible that firms with high levels of inventories and high inventory turns are

more dependent on trade credit as a source of financing. These firms may have higher levels of liquidity precisely because they do not take advantage of discounts to pay early.

As a final step in the analysis of small firms' use of trade credit, three regression models were developed to explore the extent to which firms take advantage of cash discounts for early payment. As noted above, foregoing available discounts represents a substantial economic cost to the firm. In light of that, firms that are in a position to do so should logically be expected to take a high percentage of available discounts.

A fourth dependent variable representing the percentage of cash discounts taken (cashdisc) was included in three models representing owner characteristics, firm characteristics, and bank relationships and financial ratios. Since the dependent variable was continuous in this instance, regression models were used rather than logistic regression models. The models took the following form:

Model 1: Owner Characteristics

$$\text{Cashdisc} = a + b_1\text{ownage} + b_2\text{ed} + b_3\text{exp} + b_4\text{sizeww} + b_5\text{sizebm} + b_6\text{sizehm} + b_7\text{sizeam} + e$$

Model 2: Firm Characteristics

$$\text{Cashdisc} = a + b_1\text{firmage} + b_2\text{logsales} + b_3\text{org} + b_4\ \text{urban} + b_5\text{serv} + b_6\text{transp} + b_7\text{retail} + b_8\text{insre} + b_9\text{consmin} + e$$

Model 3: Banking Relationships and Financial Ratios

$$\text{Cashdisc} = a + b_1\text{relation} + b_2\text{concent} + b_3\text{mrldeny} + b_4\text{badcred} + b_5\text{TDTA} + b_6\text{quickrat} + b_7\text{invassts} + b_8\text{invturn} + e$$

Results of the regression analyses are included in Table VII. In terms of owner characteristics, the variable representing years of experience (exp) was significant and positive. Firm owners having a greater amount of experience took a higher percentage of discounts, possibly because they had a greater appreciation for the financial advantages of doing so. Variables representing firms owned by black men and firms owned Asian men were significant and negative indicating that these firms took a lower percentage of available discounts than firms of comparable size owned by white men. The variable representing firms owned by Hispanic men was also negative, but not significant.

Within the category of firm characteristics, older firms and firms located in non-urban areas took a significantly higher percentage of cash discounts. It is possible that more mature firms are not growing as rapidly; they have more cash on hand that can be used to pay suppliers within the discount period. Mature firms may also be more aware of the cost of not taking discounts. Non-urban firms may take a higher percentage of cash discounts, because they are able to develop closer relationships with local banks willing to act as a source of short term credit. This may provide these firms with a source of liquidity that allows them to pay within the discount period. Table VII also indicates that manufacturing firms took a significantly

lower percentage of available discounts than firms in any of the other industries. This finding reinforces a point made earlier to the effect that manufacturing firms may be more likely to use trade credit as a source of financing. Manufacturing firms have a longer working capital cycle and are unable to get the cash in sufficient time to avail themselves of the discount.

Finally, in the model with variables representing characteristics of the bank relationship and financial ratios, the variable representing length of the primary banking relationship (relation) was significant and positive. This suggests that firms with longer banking relationships are able to take a higher percentage of discounts because they have an alternative source of short term credit in the form of bank loans. In this same model the variables representing credit quality (badcred) and financial leverage (TDTA) were significant and negative. Firms with a history of credit difficulties and those with high levels of debt took a lower percentage of available cash discounts, in all probability because they did not have the financial means to pay early.

VII. Summary and Discussion

This research has examined the extent to which small firms use trade credit and, for those that do use trade credit, the extent to which they use "free" versus "costly" trade credit. A shortcoming of this analysis is that it uses data exclusively from the 1998 SSBF. Since additional surveys were conducted using 1987 and 1993 data, a comparison of the three different data sets could be illuminating and certainly provides an opportunity for further research. Although the survey data are not identical from year to year[1], there are enough similarities to allow for comparison. The economic and competitive environments differed dramatically, however, from one survey to the next.

The 1998 survey was conducted in the seventh year of an economic expansion. In this environment characterized by prosperity and optimism, one would anticipate that both trade credit and bank credit would be relatively accessible. In contrast, the 1993 survey was conducted just at the point where the economy was emerging from a recession. Some regions of the country, most notably New England, were still in recession. In an environment of this type, one would anticipate a greater reluctance to lend on the part of both suppliers and banks, particularly to smaller firms that are more susceptible to economic shocks. From 1987 to 1998 there was also a tremendous amount of bank consolidation resulting in a dramatic reduction in the number of financial institutions. If this led to a reduction in the availability of bank credit, it could potentially result in a greater reliance on trade credit by small firms. A study focusing on inter-period comparisons would serve to highlight the effect of some of these economic and competitive changes over time.

For purposes of this analysis using the 1998 survey data, the use of trade credit was evaluated using two dependent variables, trade and denytrade. The variable trade indicates that the firm does or does not use trade credit. Similarly, the variable denytrade indicates that the firm has or has not been denied trade credit. Results of these two multivariate analyses indicate that firms owned by white women and firms owned by Hispanic men were significantly less likely to use trade credit than comparably sized firms owned by white men. Firms owned by black men were significantly more likely to be denied trade credit than those owned by white men, a finding that may be indicative of a credit constraint given that trade credit is one of the major sources of short term financing for small firms. Firms owned by black men and those

[1] For example, the coding for gender and minority-status differs somewhat from the 1993 to the 1998 survey. In addition, there were differences in the questions pertaining to the use of trade credit.

owned by Asian men also took a significantly lower percentage of available cash discounts revealing that these firms were using a higher percentage of "costly" rather than "free" trade credit.

The results of this analysis also indicated that younger and more experienced firm owners, larger firms, and firms organized as corporations were more likely to use trade credit. Conversely, firm owners with less experience were more likely to be denied as were the owners of younger firms. These results suggest that, consistent with prior research on bank financing, younger, smaller firms also have a more difficult time securing short term credit in the form of trade credit.

It appears that the credit quality of the firm and its ability to repay debt are important determinants of a firm's use of trade credit and its ability to secure it. Firms with a history of credit difficulties and those with a high ratio of total debt to total assets were more likely to have trade credit, probably because they need it as a source or financing. Those same firms, however, were more likely to be turned down for trade credit, because they represent more questionable credit risks.

Firms with a higher level of liquidity are more likely to have trade credit, possibly because they are in a better position to make payments. In addition, firms with higher levels of inventory and higher inventory turns were more likely to have trade credit which provides them with a means for addressing their transactions needs. Interestingly enough, firms with high levels of inventory and high inventory turns also took a significantly lower percentage of available discounts suggesting that they use trade credit as a source of financing as well.

As noted earlier in this paper, failure to pay within the discount period or payment after the due date substantially raises the cost of trade credit. In particular, giving up discounts is a very costly practice. Thus, one would anticipate that firms having the means to do so would take them. Paying late may incur yet further late fees and interest charges adding to the cost of trade credit. The use of "costly" rather than "free" trade credit was measured in this analysis using models having the variables paylate and cashdisc as dependent variables.

Results indicate that more experienced firm owners and the owners of older firms took a higher percentage of cash discounts. Experienced firm owners may have a greater awareness of the value of discounts and the cost of foregoing them. Experienced firm owners were also significantly less likely to pay late thereby avoiding more costly forms of trade credit. Older firms may be in a better position to take discounts because they are no longer growing as rapidly. Thus, they may not be as cash constrained as younger firms. To reinforce this point, younger firms were also significantly more likely to pay late after then end of the payment period. Interestingly, firms owned by Hispanic men were significantly less likely to pay late than comparably sized firms owned by white men. This may suggest a greater reliance on trade credit for these particular firms if Hispanic men did not want to risk alienating suppliers by paying late.

Finally, firms with no history of credit difficulties and those with lower ratios of total debt to total assets took a higher percentage of discounts. These were obviously firms that had a greater willingness and ability to pay within the discount period. Conversely, firms with a history of credit difficulties and high levels of leverage were significantly more likely to pay late.

These results indicate that banking relationships are an important determinant of a firm's ability to benefit from cash discounts. Firms with longer banking relationships took a higher percentage of cash discounts, possibly because they had another source for short term

credit. Alternatively, firms that had been turned down for their most recent loan were significantly more likely to pay late.

Overall, these results suggest that short term bank credit and trade credit are not necessarily substitutes for each other for many small firms. These results reveal that smaller firms are less likely to have trade credit. In addition, younger firms and firms with a history of credit difficulties or high levels of debt are less likely to be approved for trade credit. These are the same types of firms that are more likely to be turned down for short term bank credit suggesting that firms having these characteristics do, indeed, face credit constraints (Coleman, 2002b).

These results also reveal differences by gender, race, and ethnicity that echo recent findings on small firms' use of bank loans. It appears that women and minority men are less likely to use trade credit as a source of financing. Further, black men are more likely to be turned down. This implies that these groups, who face greater difficulty in securing bank credit (Coleman, 2002c), may also face barriers to securing trade credit separate from the characteristics of the firm. If this is the case, it places them at a serious disadvantage. Further research is required to explore these issues and questions more fully.

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Table I

Characteristics Firms included in 1998 SSBF: Mean Values

Variable		White Men	White Women	Black Men	Hispanic Men	Asian Men
N		2190	605	195	209	153
Totassts						
	Mean	$519,018	$241,811**	$142,229**	$147,748**	$346,558*
	Median	$67,877	$39,919	$38,456	$34,700	$65,000
Totsales						
	Mean	$1,226,729	$585,144**	$357,236**	$391,112**	$818,775
	Median	$195,026	$91,593	$73,466	$119,626	$250,000
Totemp						
	Mean	9.85	6.26**	5.57**	6.02**	7.28**
	Median	4.0	3.0	3.0	3.0	4.0
Firmage (yrs)						
	Mean	14.55	11.44**	12.01**	11.34**	10.01**
	Median	12.0	9.0	9.0	9.0	9.0
Ownage (yrs)						
	Mean	50.93	49.27**	49.52*	47.85**	46.84**
	Median	50	49.0	50.0	48.0	46.0
Exp						
	Mean	19.91	15.03**	15.88**	16.26**	14.47**
	Median	20.0	13.0	14.0	15.0	14.0

*differences from white men significant at the .05 level
**differences from white men significant at the .01 level

Table II

Characteristics of Firms included in 1998 SSBF

Variable	White Men	White Women	Black Men	Hispanic Men	Asian Men
N	2190	605	195	209	153
		Percentage of Total			
Org	48.68	37.91**	43.67	36.06**	45.85
Family	87.35	91.70**	93.47**	94.23**	84.25
Ed	53.66	55.78	51.98	53.75	55.87
Serv	40.10	49.15**	46.54	46.17	48.35
Manuf	8.96	7.74	5.81	10.64	5.98
Transp	3.67	3.59	4.45	5.21	3.99
InsRE	6.94	5.97	6.96	4.61	2.21
Retail	25.46	26.98	23.77	25.54	34.76*
ConsMin	14.85	5.79**	11.93	7.45*	4.70**
HighRisk	27.04	28.93	44.03**	38.77**	27.02
Bankrupt	2.29	2.03	4.98*	4.96*	1.01
DelinqP	11.32	11.15	27.49**	13.86	12.43
DelinqB	13.41	12.15	20.23	17.38	8.75
Judge	3.55	2.77	9.53**	6.06	2.59
BadCred	21.45	19.44	38.70**	29.74*	18.71

*differences from white men significant at the .05 level
**differences from white men significant at the .01 level

Table III

Use of Trade Credit by Firms included in 1998 SSBF

Variable	White Men	White Women	Black Men	Hispanic Men	Asian Men
N	2190	605	195	209	153
			Percentage of Total		
Trade	66.67%	53.59%**	51.13%**	46.24%**	60.74%
Denytrade	4.80%	5.51%	12.84%**	6.90%	4.71%
Paylate	42.11%	45.01%	61.69%**	35.28%	46.34%
			Mean Amount		
Trade%	72.10%	66.91%**	61.57%**	58.00%**	54.24%**
Numsupp	25.45	25.59	10.97	10.94	14.52
Cashdisc	60.01%	64.09%	48.85%*	52.84%	41.47%**
%late	30.83%	33.48%	32.46%	35.24%	28.35%

*differences from white men significant at the .05 level
**differences from white men significant at the .01 level

Table IV

Key Variables for Firms Using Trade Credit

Variable		White Men	White Women	Black Men	Hispanic Men	Asian Men
N		1676	367	105	106	104
Acctpay						
	Mean	$106,549	$36,276**	$31,559**	$61,043*	$95,662
	Median	$19,526	$4,000	$3,000	$5,000	$3,500
AP/Assts						
	Mean	0.176	0.144	0.174	0.160	0.125
	Median	0.059	0.035	0.041	0.028	0.023
Inv						
	Mean	$131,857	$53,607**	$33,216**	$25,098**	$91,934
	Median	$7,873	$5,027	$1,834	$2,750	$3,448
Inv/Assts						
	Mean	0.175	0.216	0.146	0.155	0.217
	Median	0.055	0.080	0.024	0.028	0.028
InvTurn						
	Mean	18.420	13.771	14.334	21.810	13.143
	Median	5.178	3.257	1.666	6.258	1.600
TDTA						
	Mean	0.494	0.458*	0.488	0.549	0.428*
	Median	0.538	0.427	0.132	0.146	0.483
Quickrat						
	Mean	3.057	3.164	3.874	1.216	1.429
	Median	0.593	0.150	0.057	0.157	0.081

**differences from white men significant at the .05 level
**differences from white men significant at the .01 level.

Table V

Borrowing Experience of Small Firms by Gender, Race, and Ethnicity

Variable	White Men	White Women	Black Men	Hispanic Men	Asian Men
N	2190	605	195	209	153
			Percentage of Firms		
Mrlapp	24.4%	19.9%*	31.1%	23.8%	24.6%
Mrldeny	6.4%	4.9%	19.6%**	12.8%**	11.5%*
Noapply	20.8%	25.5%**	53.3%**	29.1%**	22.6%
Concent	53.88%	54.70%	51.54%	45.14%*	32.70%**
Urban	78.7%	80.2%	90.6%**	92.5%**	95.7%**
			number of months		
Relation	98.30	82.89*	77.39**	66.94**	82.99*

*differences from white men significant at the .05 level
**differences from white men significant at the .01 level

Table VI

Results of Logistic Regression Analyses
(Values reported are Parameter Estimates)

Variable	Trade	DenyTrade	PayLate
Owner Characteristics			
Intercept	0.9780**	-2.2429**	-0.3612
Ownage	-0.0160**	-0.0105	-0.0156**
Ed	0.1229	0.2738	-0.0836
Exp	0.0202**	-0.0201*	-0.0103*
SizeWW	-0.0226**	0.0099	-0.0018
SizeBM	-0.0279	0.0865**	0.0322
SizeHM	-0.0575**	0.0192	-0.0510**
SizeAM	-0.0022	-0.0058	0.0095
Firm Characteristics			
Intercept	-3.1825**	-2.5674**	-3.6937**
Firmage	-0.0024	-0.0309**	-0.0120**
Logsales	0.3802**	0.0133	0.2453**
Org	0.4396**	0.4186*	0.3812**
Urban	-0.1314	0.4380*	0.0242
Serv	-0.9079**	0.2332**	-0.3297*
Transp	-1.9622**	-1.4606**	-0.9440**
Retail	-0.7590**	-0.5212*	-0.3638*
InsRe	-2.0216**	-1.5341**	-1.4563**
ConsMin	0.0340	-0.3135	-0.0344

Table VI (cont.)

Results of Logistic Regression Analyses
(Values reported are Parameter Estimates)

Variable	Trade	DenyTrade	PayLate
Bank Relationships and Financial Ratios			
Intercept	-0.3245**	-3.6312**	-2.1370**
Relation	0.0009**	-0.0004	-0.0004
Concent	-0.0166	-0.0732	-0.0320
Mrldeny	-0.1078	0.8633**	0.3501*
Badcred	0.3247**	1.2038**	1.2510**
TDTA	0.8959**	0.7378**	1.0901**
Quickrat	0.0232**	-0.0028	0.0102**
Invassts	0.6916**	-0.1485	0.6389**
Invturn	0.0111**	-0.0026	0.0046**

*results significant at the .05 level
**results significant at the .01 level

Table VII

Results of Regression Analyses
Dependent Variable: Percentage of Available Cash Discounts Taken

Variable	Parameter Est.	Prob>t
Owner Characteristics		
Intercept**	41.2278	0.0001
Ownage	0.0997	0.5223
Ed	3.3974	0.1478
Exp**	0.4174	0.0047
SizeWW	0.3584	0.1764
SizeBM*	-1.1159	0.0395
SizeHM	-0.4737	0.3336
Asianmen*	-1.1695	0.0163
Firm Characteristics		
Intercept**	56.2368	0.0001
Firmage**	0.3411	0.0002
Logsales	-0.7423	0.2711
Org	-1.4031	0.6416
Urban*	-5.8797	0.0293
Serv*	9.2744	0.0106
Transp*	15.7464	0.0214
Retail**	13.7248	0.0001
InsRe**	25.4680	0.0010
ConsMin**	15.4076	0.0001
Banking Characteristics and Financial Ratios		
Intercept**	69.8191	0.0001
Relation**	0.0309	0.0025
Concent	-2.6392	0.2398
Mrldeny	-5.1584	0.2778
Badcred**	-19.9977	0.0001
TDTA**	-13.9326	0.0001
Quickrat	-0.0217	0.8563
Invassts	-2.9620	0.5215
Invturn	-0.0404	0.2797

*results significant at the .05 level
**results significant at the .01 level

Appendix A

Definition of Variables

Whitemen: Dichotomous variable coded as a "1" if the firms was at least 50% owned by a white male business owner.

Whitewom: Dichotomous variable coded as a "1" if the firm was a least 50% owned by a white women business owner.

Blackmen: Dichotomous variable coded as a "1" if the firm was at least 50% owned by a black male business owner.

Hispmen: Dichotomous variable coded as a "1" if the firm was at least 50% owned by a Hispanic male business owner.

Asianmen: Dichotomous variable coded as a "1" if the firm was at least 50% owned by an Asian male business owner.

Totassts: Total assets for 1998.

Totsales: Total sales for 1998.

Logsales: Log of 1998 sales.

Sizewm: Interaction of logsales*whitewom.

Sizebm: Interaction of logsales*blackmen.

Sizehm: Interaction of logsales*Hispanic men.

Sizeam: Interaction of logsales*Asian men.

Totemp: Total full-time equivalent employees.

Firmage: Age of the firm in years.

Ownage: Age of the firm owner in years.

Exp: Owner's years of business experience.

Acctpay: Accounts payable

AP/Assts: Ratio of accounts payable to total assets.

Inv: Inventory

Inv/Assts: Ratio of inventory to total assets. Values of greater than 1 were capped at 1 to eliminate extreme values.

InvTurn: Ratio of cost of goods sold plus selling and administrative expense to inventory. Values of greater than 100 were capped at 100 to eliminate extreme values.

TDTA: Ratio of total debt to total assets. Values to greater than 1 were capped at 1 since a debt ratio of greater than 100 percent is inconsistent with the notion of a "going concern".

Quickrat: Ratio of accounts receivable plus other current assets to current liabilities. Values of greater than 100 were capped at 100 to eliminate extreme values.

Org: Organizational form. Dichotomous variable coded as a "1" if the firm was organized as a limited liability corporation or partnership, or it was an S-corporation or a C-corporation.

Family: Dichotomous variable coded as a "1" if the firms was at least 50% owned by one family.

Ed: Dichotomous variable coded as a "1" if the firm owner had attended college.

Serv: Dichotomous variable coded as a "1" if the firm was in a service industry.

Manuf: Dichotomous variable coded as a "1" if the firm was a manufacturer.

Transp: Dichotomous variable coded as a "1" if the firm was in transportation.

Insre: Dichotomous variable coded as a "1" if the firm was in insurance or real estate.

Retail: Dichotomous variable coded as a "1" if the firm was in retail or wholesale trade.

Consmin: Dichotomous variable coded as a "1" if the firm was in construction or mining.

HighRisk: Dichotomous variable coded as a "1" if the firm was rated as having "significant risk" or "high risk" by Dun & Bradstreet.

Bankrupt: Dichotomous variable coded as a "1" if the firm or its principal owner declared bankruptcy within the last 7 years.

Delinqp=Personal delinquency. Dichotomous variable coded as a "1" if the principal owner was delinquent on personal obligations within the past 3 years.

Delinqb=Business delinquency. Dichotomous variable coded as a "1" if the firm was delinquent on business obligations within the past 3 years.

Judge: Judgments against. Dichotomous variable coded as a "1" if judgments were rendered against the owner within the past 3 years.

BadCred: Dichotomous variable coded as a "1" if:

a) the firm or its principal owner declared bankruptcy within the last 7 years, or
b) the principal owner was delinquent on personal obligations within the past 3 years, or
c) the firm was delinquent on business obligations within the past 3 years, or
d) judgments were rendered against the owner within the past 3 years.

Trade: Dichotomous variable coded as a "1" if the firm used trade credit.

Denytrade: Dichotomous variable coded as a "1" if the firm had been denied trade credit.

Paylate: Dichotomous variable coded as a "1" if the firm paid the bill after the due date.

Trade%: Percentage of firm purchases made using trade credit.

Numsupp: Number of trade credit suppliers.

%late: Percentage of trade credit balances paid after the due date.

Cashdisc: Percentage of possible cash discounts taken by firm.

Mrlapp: Dichotomous variable coded as a "1" if the firm applied for a loan within the previous 3 years.

Mrldeny: Dichotomous variable coded as a "1" if the firm was denied a loan within the previous 3 years.

Noapply: Dichotomous variable coded as a "1" if the firm did not apply for a loan within the previous 3 years because the owner assumed the loan would be denied.

Concent: Dichotomous variable coded as a "1" if the Herfindahl index was greater than 1800.

Urban: Dichotomous variable coded as a "1" if the firm was located in a Metropolitan Statistical Area.

Relation: length of relationship with primary bank measured in months.